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(71) Applicant: KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(71) Applicant *(for SE only)*: PHILIPS AB [SE/SE]; Kottbygatan 7, Kista, S-164 85 Stockholm (SE).

(72) Inventors: NEERVOORT, Paulus, C.; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). ROBERTS, Guy, James; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). HEESEMANS, Michael; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). KIM, S., H.; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). VAN VIANEN, Edwin, P., G.; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(74) Agent: FAESSEN, Louis, M., H.; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

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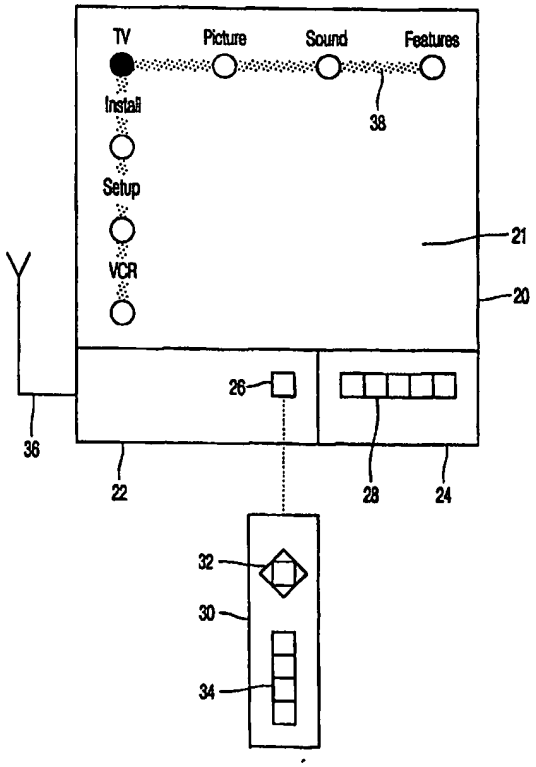
(54) Title: AN AUDIO/VIDEO SET AND A METHOD FOR OPERATING THE AUDIO/VIDEO SET AS BASED ON HIERARCHICAL MENUING

(57) Abstract

An audio/video set is operated with hierarchical menus. It displays a menu string of first items in a first coordinate direction on the screen and detects a user selecting an item thereamong. Upon so detecting, the set displays a menu string of second items in a coordinate direction transverse to the first direction and through the selected item. It detects user selection among the second items for activating an associated television functionality. It displays the items in a bulletized manner as annotated by supporting indicativity.



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AN AUDIO/VIDEO SET AND A METHOD FOR OPERATING THE AUDIO/VIDEO SET AS BASED ON HIERARCHICAL MENUING

BACKGROUND OF THE INVENTION

The invention relates to a method as recited in the preamble of Claim 1. Examples of such audio/video sets are television sets, hifi sets, recorders, disc players, etcetera, inclusive of settop boxes, remote control devices and similar devices associated to such sets, and hybrid sets, such as a combination of TV and VCR, or with still other devices. Various categories of the above, such as television sets, are notoriously difficult to operate and in particular, to program. The number of television channels, functionality modes, parameter settings, image subdivisions, recorder functions and others is great enough to embarrass most non-professional user persons. The inventors have experienced that for optimally guiding a user, a limited but explicit amount of on-screen text should be available. Similar arguments apply to various other categories of such audio/video sets. Moreover, non-uniformity among such categories is being experienced by a user as annoying.

SUMMARY TO THE INVENTION

In consequence, amongst other things, it is an object of the present invention to provide a better concept for a graphics-based screen layout principle for controlling and/or programming an audio/video set for household use, which concept should furthermore straightforwardly translate among various categories of such sets. Now therefore, according to one of its aspects the invention is characterized according to the characterizing part of Claim 1.

By itself, IBM TDB Vol 34, No.8, p.432-433, January 1992 gives a hierarchical menu structure with bulletized strings disposed in vertical and horizontal directions, but absence therein of further displayed specifying information renders such menu little useful for controlling a specific device like an audio/video set for household use.

The coordinate directions are often substantially perpendicular to each other, but this is not an express limitation. In principle, there may be three or more coordinate directions within the display plane. The bulletized display may for each item realize the associated bullet as a relatively dark disk. Other graphical elements are useful as well, such as diamonds, asterisks, etcetera. The elements may have a uniform shape, but this is not a strict requirement, certain elements may get some highlighting, coloring or

enlargement. Even a certain amount of iconizing may be useful. The bulletizing may then indicate localizing and stringing of the items in question. The strings will often be straight, but some curvature could be allowed as well. Now, a particularly instructive element has proven to be the so-called **puck**, which may contain up to four sectors that may each selectively be "pushed away" upon user-actuation of the item in question: coexistently with this pushing, further information is then joined to the actuated item, whereby a further selecting or actuating may be effected by the user. Further supporting indicativity may be used in the form of an icon, one or more words, or other appropriate, space-saving identifiers.

The invention also relates to an audio/video set encompassing a display arranged according for practising the above method. Further advantageous aspects of the invention are recited in dependent Claims.

BRIEF DESCRIPTION OF THE DRAWING

These and further aspects and advantages of the invention will be discussed more in detail hereinafter with reference to the disclosure of preferred embodiments, and in particular with reference to the appended Figures that show:

Figure 1, a basic TV environment of the invention;

Figure 2, the principle of diagonal cursor movement;

Figure 3, an example of a BAR;

Figure 4, an example of a slider;

Figures 5A, 5B, two examples of a list;

Figures 6A, 6B, two examples of a "more" item;

Figure 7 an example of navigation support arrows;

Figure 8, an example of a Boolean TOGGLE;

Figure 9, an example of a Selection List Mechanism.

LIST OF CONCEPT PRINCIPLES

Hereinafter, a list of design concept principles is presented. The controls are as much as possible put into a functional context: they appear only when the function wherein they are used becomes active. For instance, Teletext buttons are only placed on the screen when Teletext is active. Generally, the number of keys on the remote control device may remain unchanged, but in certain cases a few remote control buttons may migrate to on-screen buttons. Also, new functions may be created on-screen without introducing them on the remote control device. Generally, remote control will have only the most frequently used functions.

In general, functionality has been divided over four levels: Remote Control Elements, On-screen Buttons, Primary Menu Items, and finally Secondary Menu Items that are hidden behind a so-called 'More' item. In this manner, certain functions may be made easily accessible, whereas others are more or less hidden deeper in the hierarchy. It is not necessary that every set category has been provided with all four levels: this depends on the type, size, and complexity of the category or set in question.

Accessing of the content of a button or icon is fast and easy. The navigation is adaptable to a free moving or jumping so-called "puck" element with a pointing-and-clicking feature. On-the-spot information may be activated through a specific key. When a user selects a particular item, this item will immediately present its sub-items, without a necessity for further "clicking". A user's past selection path remains displayed on-screen for facilitating a way back. Alternative but non-selected items of this path will disappear to reduce screen pollution. Furthermore, items **previous** and **next** remain both displayed, so that a user may easily go forward and backward in the menu structure. For navigation proper, no secondary confirmation is necessary.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 shows a basic TV environment of the invention. For other audio/video set types, functionality translation is straightforward. TV set 20 has video signal receiving means such as antenna 36, part 24 for receiving manual user actuations of buttons 28, and driver part 22 that symbolizes in-set electronics and furthermore has a signal port 26 for communicating wireless signals with remote control device 30. Speech control input and response output could be a useful feature. Remote Control Device 30 has been provided with cursor controls 32 and further controls 34. Upper part 21 has a Main Menu Buildup Display 38, that has a row of bulletized items including bullets for TV, Picture, Sound and Features, and furthermore a column of bulletized items including bullets for **TV**, Install, Setup and **VCR**. For other types of devices and functions a similar set of items would be provided. Through selection, the TV bullet at the intersecting row and column has been displayed in a highlighted manner. Moving the highlighting away from the "TV"-bullet along either row or column to another item may cause a different bullet string to unroll from the other item than the original one if for such other item also a string had indeed been provided. The earlier string will then disappear.

Figure 2 shows the principle of diagonal cursor movement. The user may only navigate to items that are visible and available on screen. The behaviour of the selected widget or item has always precedence over the generic diagonal navigation. Thus, cursor

behaviour may be specified within the particular widget. If not, then the generic navigation takes over. When the cursor is controlled in a slanted manner, it will move towards the item that is closest within the quadrant or otherwise appropriate angular area associated to that direction.

Figure 3 gives an example of a particular tool, in this case a BAR, that is generally used for controlling a value for a particular function. When the function is selected, the puck-shaped cursor "pushes" one of its four segments away and transforms into a bar with a range of 0 to 100% of the adjustable value. Generally, the transformed cursor indicates the applicable type of tool, and also the manner to control it. If in the situation shown, a user will actuate cursor control to West or East, the bar will immediately begin to change its value as long as the cursor control is kept actuated in that direction. During this movement, the navigation support arrow on the side remains highlighted.

Figure 4 shows an example of another tool, in this case a slider that is used when a function needs "balancing". Upon selection of the function, the cursor puck will in similar manner as shown with reference to Figure 3, transform into a slider with a range between -50% and +50% of the adjustable value, with a clear visual midpoint at 0%. If in the situation shown a user will actuate cursor control to West or East, the slider immediately begins to change its value in that direction as long as the cursor control is kept actuated. During this movement, the navigation support arrow on that side remains highlighted. A number will be added when the slider or bar in question is actually applied in the interface in question. This has been shown in Figure 3. Both slider and bar provide immediate feedback of any change: feedback is fast, and a direct mapping exists between the adjusted value and graphic feedback. Bars and sliders may run in any other coordinate direction.

Figures 5A, 5B give a further tool, in this case two examples of lists for letting a user person select among a series of options of which only one may be active at a time (Fig. 5A). When a function is selected, its options show immediately in the list. By moving East, the cursor enters the list at the Default Selection (Fig. 5B), which may be replaced by the most recent setting. This entering may influence the actual setting of the device in a corresponding manner. Similarly, moving the cursor North or South makes the list move South and North, respectively. When a particular option has been selected, moving West operates to confirm and to return again to the next higher level.

Figures 6A, 6B show two examples of a superbulletized or "more" item. Here, its shape (Fig. 5A) as a plurality of quasi superimposed bullets suggests availability of various further items. Other shapes of the item are feasible as well. When the cursor is

moved South, the "more" item unfolds and reveals the further items (Fig. 5B). The "more" feature is used for long menu rows or columns that would extend beyond an available or otherwise predetermined screen area, or if a need has been felt to keep the screen more "clean". A "more" item may lie at either end or at both ends of a menu string. When the cursor moves to the "more" item, all or part of the hidden items will show up, and some or all of the earlier items may in turn be squeezed or wrapped up into a new or already existing "more" item. In all cases, the displaying of a string is effected by a kind of dynamical "unrolling", so that items that are closer to the origin will be shown earlier in time than items that lie further away. This has been found to give a user the idea of commonality among the items of the string in question.

Figure 7 shows an example of navigation support arrow displayed here on the puck-shaped bullet to indicate which directions a user person may take, with respect to navigating to other bullets, and also for effecting control, such as on a bar device or slider device. Such navigation arrow is a first-level on-screen help. In the embodiment shown, three directions are allowed, but Northward is blocked.

Figure 8 shows an example of another **tool**, in this case of a Boolean TOGGLE, which is used for a function that has only two levels. In the embodiment, user actuation will activate the default state of the toggle; in this layout, moving the cursor East will activate the other setting, which is swapped in position with the previously selected setting. Such swapping may be repeated.

Figure 9 shows an example of a still further **tool**, in this case of a Selection List Mechanism. This widget is a combination of a list mechanism with other widgets. It may be a further list, a Boolean Toggle, or an on-screen Button, which by themselves do not require both East and West navigation. The difference with a standard list is that here the items need not be mutually exclusive. The difference with a sub-menu is that the selection of the item in the list already implies a setting, whereas in a normal menu, selecting an item that itself has a submenu does not set anything.

CLAIMS:

1. A method for operating an audio/video set as based on hierarchical menuing, and comprising displaying a first menu string of selectable first items in a first coordinated direction on a screen and detecting user selection thereamong, said method being characterized by the steps of:

- a. under control of said detecting of a selected first item displaying a second menu string of one or more selectable second items in a second coordinated direction on the screen transverse to said first direction and intersecting the first string at the selected first item,
- b. detecting user selection among the second items for activating an associated audio/video functionality,
- c. displaying said items in a bulletized manner whilst annotating by supporting indicativity.

2. A method as claimed in Claim 1, and therein allowing to detect a further said selection and thereupon repeating the steps a through c in a hierarchical manner with respect to any further selectable item and with respect to an associated direction.

3. A method as claimed in Claim 1, while maintaining display of any earlier selected item, whilst hiding non-selected first or second items among which a said selection had been performed.

4. A method as claimed in Claim 1, whilst displaying a particular item in the form of a **puck**, which may contain up to four sub-items that may each selectively be "pushed away" upon user-actuation of the item in question for then joining further information to the actuated item, and enabling a further selecting or actuating by a user.

5. A method as claimed in Claim 1, wherein user control functionality for a plurality of said audio/video set categories has been distributed over four successive levels containing Remote Control Elements, On-Screen Buttons, Primary Menu Items and Secondary Menu Items.

6. A method as claimed in Claim 1, while furthermore blocking a user from navigating to any item other than those actually visible, while upon detecting cursor actuation in a slanted direction, driving it to an item that is closest within an angular region associated

to that direction.

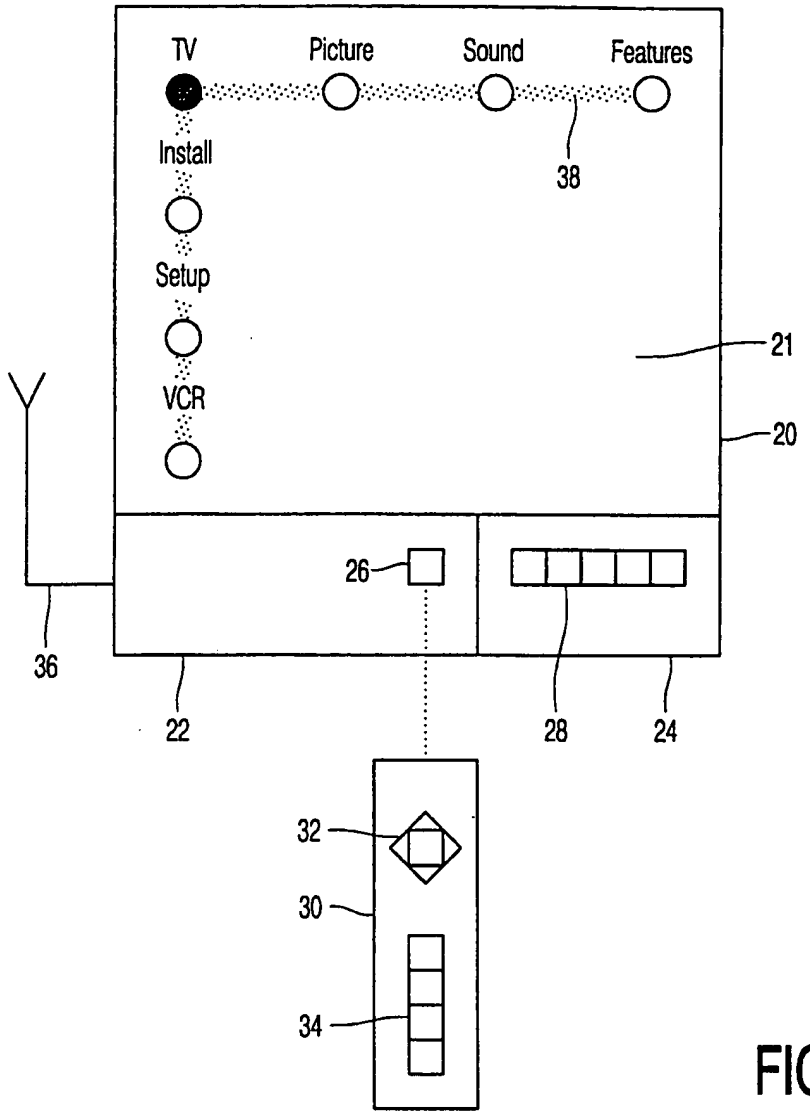
7. A method as claimed in Claim 1 wherein an excess length of a menu string caused by Secondary Menu Items outside a predetermined screen area is indicated by a terminal "more" item of the string in question in a superbulletized manner.

8. A method as claimed in Claim 1, wherein specifying of a scalable quantity associated to a selected string item is indicated on a slider item or bar item adjoining the selected first item.

9. A method as claimed in Claim 1, wherein the display of a string that intersects a higher hierarchical level at a selected item is being dynamically unrolled in a gradual manner.

10. An audio/video set arranged for practicing a method as claimed in Claim 1.

11. A set as claimed in Claim 9 that is screen-based.


TV
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VCR
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34

FIG. 1

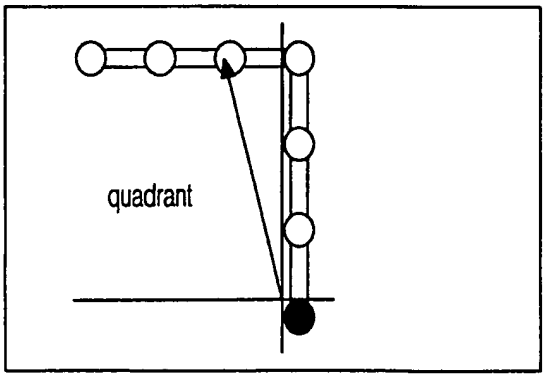
quadrant

FIG. 2

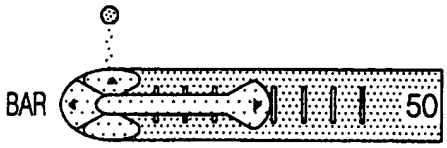

FIG. 3

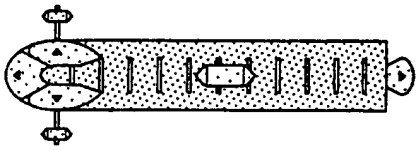

FIG. 4

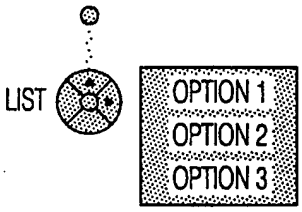

FIG. 5A

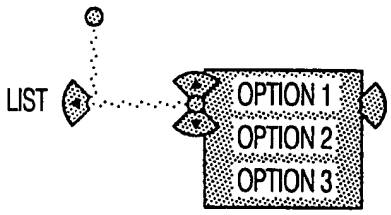

FIG. 5B

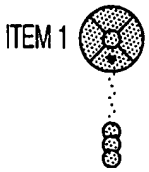

FIG. 6A

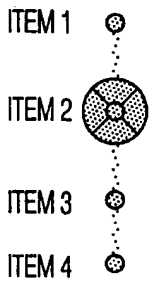

FIG. 6B

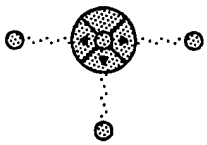

FIG. 7

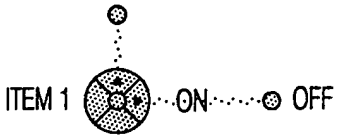

FIG. 8A

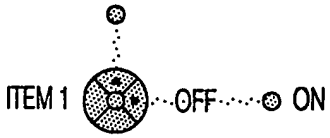

FIG. 8B

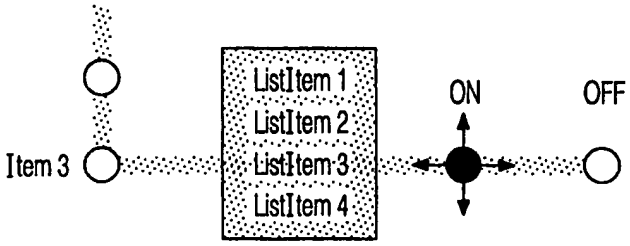

FIG. 9